

Student Name _____

Teacher Name _____

School _____

System _____

ALGEBRA I

Item Sampler

**Tennessee End of Course Assessment
Algebra I Form 1**

Reporting Category: Mathematical Processes

The Pearson logo consists of the word "PEARSON" in a bold, white, sans-serif font, centered within a solid black rectangular background.

PEARSON

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Algebra I Reference Page

Abbreviations for Geometric Formulas

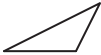


| | | |
|---------------------|-----------------|----------------------|
| A = area | d = diameter | r = radius |
| B = area of base | h = height | s = length of side |
| b = base | ℓ = length | V = volume |
| C = circumference | P = perimeter | w = width |

Perimeter (P) and Circumference (C)

| | |
|--------------|--------------------------------------|
| Any Polygon: | P = sum of side lengths |
| Rectangle: | $P = 2\ell + 2w$ |
| Circle: | $C = 2\pi r$ or πd |
| | $\pi \approx 3.14$ or $\frac{22}{7}$ |

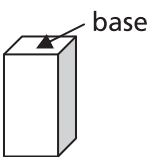

Plane Figures

Area (A)

| | | |
|------------|---|--------------------------------------|
| Triangle: |  | $A = \frac{1}{2}bh$ |
| Rectangle: |  | $A = \ell w$ |
| Circle: |  | $A = \pi r^2$ |
| | | $\pi \approx 3.14$ or $\frac{22}{7}$ |

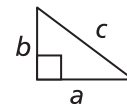
Solid Figures

Volume (V)

| | | |
|-------------------------|---|---------------------------------|
| Right Rectangular Prism |  | $V = Bh$ or $V = \ell wh$ |
| Cube |  | $V = s^3$ |

Algebraic Formulas and Equations

| | |
|-------------------------------------|---|
| $d = rt$ | distance = rate \times time |
| Distance Formula | $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ |
| | d = distance between two points |
| Midpoint Formula: | $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ |
| Slope Formula: | $m = \frac{y_2 - y_1}{x_2 - x_1}$ |
| Standard Form of a Linear Equation: | $Ax + By = C$ |
| Slope-Intercept Equation: | $y = mx + b$ |
| Point-Slope Equation: | $y - y_1 = m(x - x_1)$ |
| Pythagorean Theorem: | $a^2 + b^2 = c^2$ |



Quadratics

| | |
|---------------------------|--|
| For $ax^2 + bx + c = 0$: | $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ |
| Discriminant: | $b^2 - 4ac$ |

Measurement Conversions

LENGTH

| | |
|-------------------------------|------------------------------------|
| 1 foot (ft) = 12 inches (in.) | 1 cup (c) = 8 fluid ounces (fl oz) |
| 1 yard (yd) = 3 feet | 1 pint (pt) = 2 cups |
| 1 yard = 36 inches | 1 quart (qt) = 2 pints |
| 1 mile = 1,760 yards | 1 quart = 4 cups |
| 1 mile = 5,280 feet | 1 gallon (gal) = 4 quarts |

WEIGHT

| |
|-------------------------------|
| 1 pound (lb) = 16 ounces (oz) |
| 1 ton (T) = 2,000 pounds |

CONVERSION BETWEEN CUSTOMARY AND METRIC MEASUREMENT

| | |
|-------------------|-------------------|
| 1 yard = 0.9144 m | 1 quart = 0.946 L |
| 1 foot = 0.3048 m | 1 ounce = 28.35 g |
| 1 inch = 2.54 cm | 1 lb = 0.45 kg |

Contents

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Introduction to Algebra I

Content of tests

The testing program titled the *Tennessee End of Course Assessment* was established to meet the Tennessee mandate for end of course assessments in Tennessee secondary schools. These tests measure the Tennessee State Performance Indicators. Subject areas covered by the end of course assessments include Mathematics, Language Arts, History, and Science.

Test development

For the *Tennessee End of Course Assessment*, a staff of writers – composed of both teachers and professional test developers experienced in each of the content areas – researched and wrote the items. Professional editors and content specialists carefully reviewed all items and test directions for content and accuracy. To provide a large pool of items for final test selection, the test developers created approximately twice as many items as were needed in the final editions of the tests.

After tryout tests were administered, student responses were analyzed. Professional content editors and researchers carefully reviewed items, their data, and test directions for content, suitability, and accuracy before including particular items and test directions in operational tests.

Test administration

Tennessee End of Course Assessments are given to students as they near the end of courses that are included in the program. Tests may be given midyear for block schedules or at the end of the school year.

This test contains 65 multiple-choice questions.

You will have ample time to read and answer each of the questions. The Algebra I test has been designed to be administered in one session and is not timed. The first 15 minutes are set aside to complete identifying data on the answer sheet.

Calculator use is optional. Sharing calculators during testing is not permitted.

The following types of calculators/devices may **NOT** be used during the test:

- pocket organizers
- electronic writing pads or input devices
- Some examples of prohibited calculators are:
 - Casio models: CFX-9970G, Algebra FX 2.0
 - Hewlett-Packard models: HP-40G, HP-49G
 - Texas Instruments models: TI-89, TI-92, Voyage 200, TI-NSPIRE – the CAS version (The non-CAS version of TI-NSPIRE is allowable.)
- calculators that can communicate (transfer data or information) wirelessly with other student calculators/devices
- cell phones, PSPs, and/or iPods
- Students may use any four-function, scientific, or graphing calculator does not have any of the above features. The use of units that have a Computer Algebra System (CAS) is NOT allowed.

Tips for Taking the Test

Preparing for the test

- Review this Tennessee End of Course Item Sampler for Algebra I carefully and thoroughly.
- Acquire the Tennessee End of Course Practice Test for Algebra I, and take the test several times.
- Become familiar with the correct way to mark answers on the answer sheet. There is a sample answer sheet in this Practice Test.

Before the test

- Get a good night's sleep. To do your best, you need to be rested.

During the test

- Relax. It is normal to be somewhat nervous before the test. Try to relax and not worry.
- Listen. Listen to and read the test directions carefully. Ask for an explanation of the directions if you do not understand them.
- Plan your time. Do not spend too much time on any one question. If a question seems to take too long, skip it and return to it later. First answer all questions that you are sure about.
- Think. If you are not sure how to answer a question, read it again and try your best to answer the question. Rule out answer choices that you know are incorrect and choose from those that remain.

Directions for Using the Item Sampler

This Item Sampler for Algebra I provides specific information to students and teachers. It contains examples of different item types for each Performance Indicator that may be tested in any given end of course test administration. Performance Indicators have been grouped by Reporting Categories. These Reporting Categories will be used to report information regarding performance on the end of course test to students, teachers, schools, and systems.

The items in this Item Sampler will not be found in the end of course tests. The number of items in this Item Sampler does not reflect the emphasis of content on the test. In order to identify the emphasis of content, the End of Course Assessment Practice Test for Algebra I should be used. The Practice Test gives a better representation of content emphasis across Reporting Categories and Performance Indicators.

An Answer Key is located in Page 30. Use it to check your answers. Review items that you get wrong.

Reporting Category: Mathematical Processes

Numbers 1 through 40

Performance Indicator: 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

1.

The table shows the amount of time, in minutes, a printer takes to print pages.

Printing Time

| Time (minutes) | Number of Pages |
|----------------|-----------------|
| 2 | 26 |
| 4 | 52 |
| 6 | 78 |
| 8 | 104 |
| 10 | 130 |

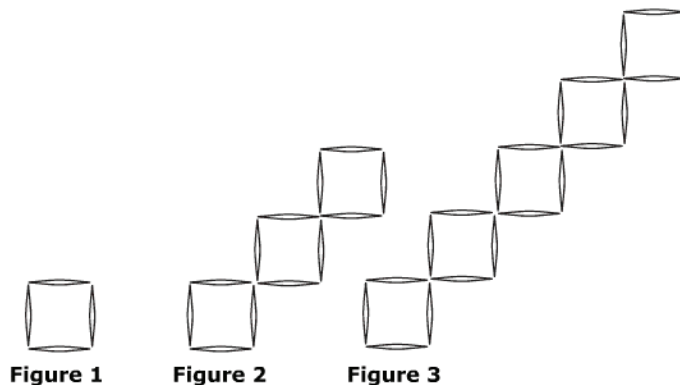
The printer continues to print at the same rate. How long does the printer take to print exactly 247 pages?

- ☐ A 17 minutes
- ☐ B 19 minutes
- ☐ C 20 minutes
- ☐ D 25 minutes

Performance Indicator: 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

2.

Karen examines the sequence made by toothpick squares. She concludes that it follows the rule $f(n) = 8n - 4$, where n represents the position of the figure in the sequence and $f(n)$ represents the total number of toothpicks in each figure.



What is the total number of toothpicks in Figure 4 and Figure 5 respectively?

- ☐ A 28, 36
- ☐ B 28, 32
- ☐ C 32, 40
- ☐ D 36, 44

Performance Indicator: 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

3.

Which table best describes the function $f(x) = 5x - 2$?

☐ A

| x | $f(x)$ |
|-----|--------|
| 1 | 7 |
| 2 | 12 |
| 3 | 17 |
| 4 | 22 |

☐ C

| x | $f(x)$ |
|-----|--------|
| 1 | 3 |
| 2 | 8 |
| 3 | 13 |
| 4 | 18 |

☐ B

| x | $f(x)$ |
|-----|--------|
| 1 | 3 |
| 2 | 1 |
| 3 | -1 |
| 4 | -3 |

☐ D

| x | $f(x)$ |
|-----|--------|
| 1 | 7 |
| 2 | 9 |
| 3 | 11 |
| 4 | 13 |

Performance Indicator: 3102.1.2 Write an equation symbolically to express a contextual problem.

4.

A waiter makes \$8 per hour plus 10% of the total amount his customers spend. Which equation represents his weekly earnings, e , in dollars, if he works h hours per week and his customers spend \$990?

☐ A $e = 0.8h + 990$

☐ B $e = 0.8h + 99$

☐ C $e = 8h + 99$

☐ D $e = 8h + 990$

Performance Indicator: 3102.1.2 Write an equation symbolically to express a contextual problem.

5.

Vanessa's coffeemaker fills a 1-ounce cup in 30 seconds. Which equation can be used to determine the time, t , in minutes the coffeemaker takes to fill an 11-ounce mug?

- ☐ A $11(0.5) = t$
- ☐ B $\frac{11}{t} = 0.5$
- ☐ C $11(30) = t$
- ☐ D $\frac{11}{t} = 30$

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

6.

What is the value of the expression $y - \frac{xz}{3} + \frac{yz^3}{4}$, when $x = 3$, $y = -8$, and $z = -\frac{1}{2}$?

- ☐ A $-\frac{31}{4}$
- ☐ B $-\frac{29}{4}$
- ☐ C $-\frac{7}{4}$
- ☐ D $-\frac{5}{4}$

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

7.

The table below shows the number of visitors in a water park over a period of two days. The cost of an admission ticket to the water park is \$19.95 per person.

Water Park Attendance

| Day | Attendance |
|----------|------------|
| Friday | 180 |
| Saturday | 360 |

Two methods can be used to find the total amount collected from the admission tickets on Saturday.

Method 1: Double the attendance on Friday and multiply that amount by the price of one ticket:
 $(2 \times 180) \times \$19.95$.

Method 2: Multiply the attendance on Friday by the price of one ticket and double the amount:
 $(180 \times \$19.95) \times 2$.

Which two properties justify that both methods will give the same answer?

- ☐ A multiplicative identity and associative properties
- ☐ B additive identity and associative properties
- ☐ C distributive and commutative properties
- ☐ D associative and commutative properties

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

8.

If $x = \frac{2t^3}{3}$ and $y = t - 1$, what is the value of the expression $\frac{4}{9}x + y^2$, when $t = 0.3$?

- ☐ A 0.508
- ☐ B 0.498
- ☐ C -0.472
- ☐ D -0.482

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

9.

Evaluate $\frac{m^2+2n}{-2} + 4mn$ for $m = 2$ and $n = -3$.

- ☐ A -23
- ☐ B -19
- ☐ C 19
- ☐ D 23

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

10.

Simplify: $2s^2(s^4 + 2t) - 5(2s^6 + 3t^2 - 3s^2t)$

- ☐ A $2s^8 - 10s^6 - 3s^2t + 3t^2 + 2t$
- ☐ B $2s^8 - 10s^6 + 19s^2t - 15t^2$
- ☐ C $-8s^6 - 3s^2t + 3t^2 + 2t$
- ☐ D $-8s^6 + 19s^2t - 15t^2$

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

11.

Which scenario best represents the equation $y = 10x + 7$?

- ☐ A the total cost, y , of buying x books for \$17 each
- ☐ B the total amount earned, y , dog-sitting for x hours at \$10 per hour for 7 dogs
- ☐ C the total cost, y , of ordering x tiles worth \$10 each with a \$7 shipping charge
- ☐ D the total amount, y , spent buying x DVDs for \$7 each plus one set of headphones for \$10

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

12.

A painter needs 2.5 gallons of paint to cover 875 square feet of wall as modeled by the function $p(x) = \frac{x}{350}$, where x is the area to paint and $p(x)$ is the amount of paint needed. Which table shows this relationship between the area to paint and the amount of paint needed?

☐ A

| Area, x (square feet) | Amount of Paint, $p(x)$ (gallons) |
|----------------------------|---|
| 385 | 1.1 |
| 455 | 1.3 |
| 630 | 1.8 |
| 840 | 2.4 |

☐ C

| Area, x (square feet) | Amount of Paint, $p(x)$ (gallons) |
|----------------------------|---|
| 350 | 1.0 |
| 250 | 1.4 |
| 175 | 2.0 |
| 125 | 2.8 |

☐ B

| Area, x (square feet) | Amount of Paint, $p(x)$ (gallons) |
|----------------------------|---|
| 406 | 1.4 |
| 522 | 1.8 |
| 638 | 2.2 |
| 754 | 2.6 |

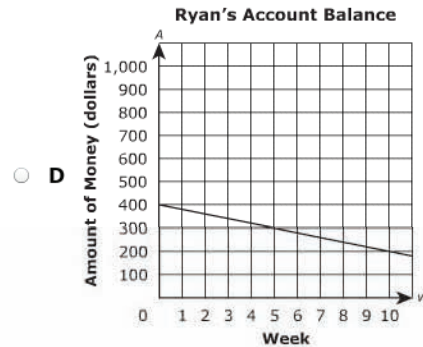
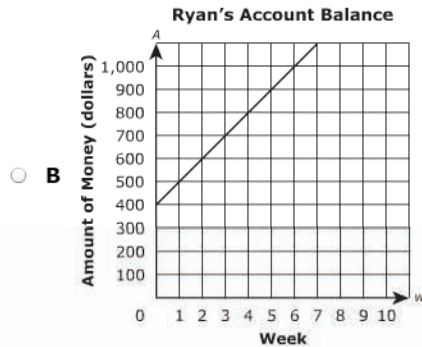
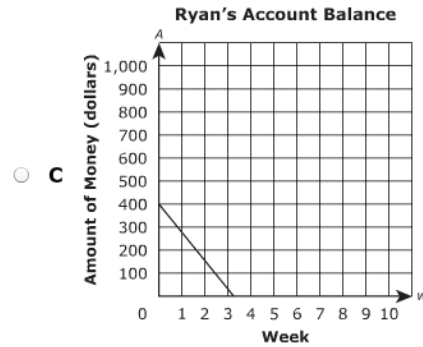
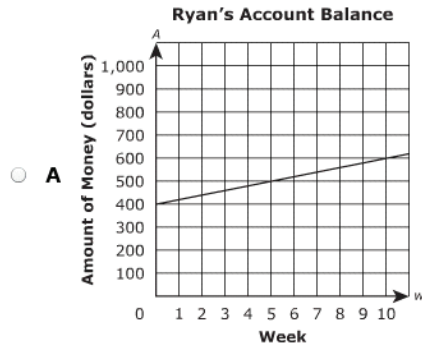
☐ D

| Area, x (square feet) | Amount of Paint, $p(x)$ (gallons) |
|----------------------------|---|
| 1,050 | 1.2 |
| 1,575 | 1.8 |
| 1,925 | 2.2 |
| 2,100 | 2.4 |

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

13.

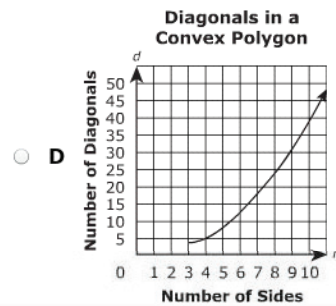
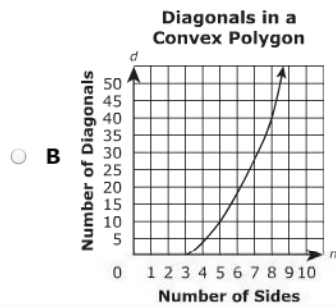
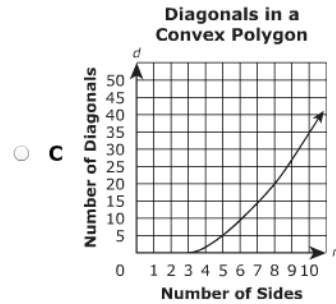
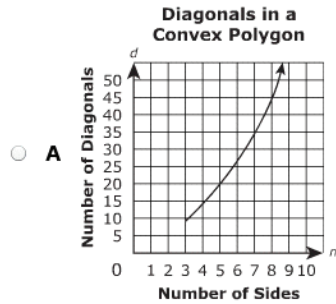
Ryan starts with \$400 in a bank account. Each week he deposits \$100 into the account from his paycheck. If he withdraws \$120 from the account each week, which graph can be used to determine his account balance?



Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

14.

The number of diagonals, d , that can be drawn in an n -sided convex polygon is represented by $d = \frac{n(n-3)}{2}$. Which graph best models this relationship?



Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

15.

A linear equation $y = 2.5x + 60$ represents the total cost, y , of producing x number of box lunches. Which table shows the relationship between the total cost and the number of box lunches?

☐ **A**

| Number of Box Lunches, x | Total Cost, y |
|----------------------------|-----------------|
| 50 | \$725.00 |
| 75 | \$787.50 |
| 100 | \$850.00 |

☐ **C**

| Number of Box Lunches, x | Total Cost, y |
|----------------------------|-----------------|
| 50 | \$125.00 |
| 75 | \$187.50 |
| 100 | \$250.00 |

☐ **B**

| Number of Box Lunches, x | Total Cost, y |
|----------------------------|-----------------|
| 50 | \$185.00 |
| 75 | \$247.50 |
| 100 | \$310.00 |

☐ **D**

| Number of Box Lunches, x | Total Cost, y |
|----------------------------|-----------------|
| 50 | \$112.50 |
| 75 | \$137.50 |
| 100 | \$162.50 |

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

16.

Peter made a table of his charges for shoveling snow on 3 days.

| Day | Amount of Snowfall, a (inches) | Charge, c |
|-----------|----------------------------------|-------------|
| Monday | 3 | \$9.00 |
| Tuesday | 5 | \$14.00 |
| Wednesday | 7 | \$19.00 |

Which equation shows the relationship between the charge, c , and the amount of snowfall, a ?

- ☐ **A** $c = 3a$
☐ **B** $c = 2.5a$
☐ **C** $c = 2.5a + 1.5$
☐ **D** $c = 1.5a + 2.5$

Performance Indicator: 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.

17.

What happens to the graph of $y = -4x^2$ when the equation becomes $y = 4x^2$?

- ☐ **A** The graph is shifted down.
- ☐ **B** The graph is shifted up.
- ☐ **C** The graph is reflected over the y axis.
- ☐ **D** The graph is reflected over the x axis.

Performance Indicator: 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

18.

Water boils at 100°C at sea level. If water boils at 80°C at 4 miles above sea level, what is the rate of change of the boiling point of water with respect to the distance above sea level?

- ☐ **A** -20°C per mile
- ☐ **B** -5°C per mile
- ☐ **C** 5°C per mile
- ☐ **D** 20°C per mile

Performance Indicator: 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

19.

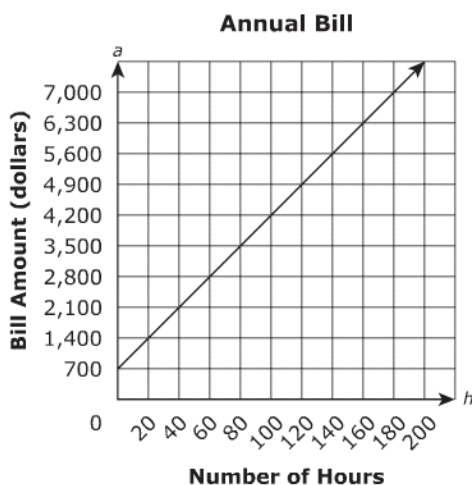
Robert buys 5 baseball cards every month. The equation $y = 75 + 5x$ represents the number of baseball cards that Robert has after x months. What does the slope represent in this situation?

- ☐ A the number of months
- ☐ B the number of baseball cards after x months
- ☐ C the initial number of baseball cards in Robert's collection
- ☐ D the number of baseball cards Robert buys every month

Performance Indicator: 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

20.

A local gym charges a fixed annual membership fee and an additional charge for each hour, h , spent with a personal trainer. The graph shows the relationship between the bill amount and the number of hours spent with a personal trainer.



What is the hourly rate charged for the time spent with a personal trainer?

- ☐ A \$30 per hour
- ☐ B \$35 per hour
- ☐ C \$70 per hour
- ☐ D \$105 per hour

Performance Indicator: 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

21.

A hot air balloon starts descending after reaching a height of 500 feet. The table shows the height in feet, $f(t)$, of the hot air balloon after t seconds.

Height of Hot Air Balloon

| Time, t (in seconds) | Height $f(t)$ (in feet) |
|---------------------------|----------------------------|
| 1 | 486 |
| 2 | 472 |
| 3 | 458 |
| 4 | 444 |
| 5 | 430 |

Which function best describes the height, $f(t)$, of the hot air balloon after t seconds?

- ☐ A $f(t) = 486 - 14t$
- ☐ B $f(t) = 14t - 486$
- ☐ C $f(t) = 500 - 14t$
- ☐ D $f(t) = 14t - 500$

Performance Indicator: 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

22.

The first two terms in a sequence are 10 and 13. The sequence follows the rule $f(x) = 3x + 7$, where x represents the position of the term in the sequence. Which list represents the next five terms in the sequence?

- ☐ A 16, 19, 22, 25, 28
- ☐ B 16, 23, 26, 33, 36
- ☐ C 20, 23, 30, 33, 40
- ☐ D 20, 27, 34, 41, 48

Performance Indicator: 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation.

23.

The table shows Xavier's earnings, $f(x)$, after working x number of hours.

Xavier's Earnings

| Number of Hours, x | Earnings, $f(x)$ |
|----------------------|------------------|
| 1 | \$10 |
| 2 | \$18 |
| 3 | \$26 |
| 4 | \$34 |
| 5 | \$42 |

Which function best describes Xavier's earnings?

- ☐ A $f(x) = 8x$
- ☐ B $f(x) = x + 2$
- ☐ C $f(x) = 8x + 2$
- ☐ D $f(x) = 2x + 8$

Performance Indicator: 3102.1.2 Write an equation symbolically to express a contextual problem.

24.

At a state fair, Hannah pays \$10.00 for the admission fee, \$5.00 for parking, and \$2 for each ride. Which equation relates the relationship between the total amount Hannah spent, d , in dollars and the number of rides, r ?

- ☐ A $d = 2r + 5$
- ☐ B $d = 2r + 15$
- ☐ C $d = 10r + 7$
- ☐ D $d = 15r + 2$

Performance Indicator: 3102.1.2 Write an equation symbolically to express a contextual problem.

25.

An empty crate used to ship watermelons weighs 35 pounds. The average weight of a watermelon is about 18 pounds. Which equation can be used to find the number of watermelons, n , in a crate that weighs 143 pounds?

- ☐ A $143 = 18n - 35$
- ☐ B $143 = 18n + 35$
- ☐ C $143 = 35n + 18$
- ☐ D $143 = (18 + 35)n$

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

26.

Evaluate $\frac{2}{3}xy - x^2y$ for $x = -3$ and $y = -4$.

- ☐ A -44
- ☐ B -28
- ☐ C 28
- ☐ D 44

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

27.

April bought two pairs of jeans for \$42 each and two T-shirts for \$14 each. She calculated the total amount by multiplying 2 by \$56, while the bill showed the total amount as \$84 plus \$28. Which property can be used to justify that these two amounts are the same?

- ☐ A associative property
- ☐ B distributive property
- ☐ C addition property of equality
- ☐ D multiplication property of equality

Performance Indicator: 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems.

28.

Simplify: $3x(x + 2y) + 4(6 - xy)$

- ☐ A $3x^2 + 2xy + 24$
- ☐ B $3x + 2xy + 24$
- ☐ C $3x^2 - xy + 2y + 24$
- ☐ D $3x - xy + 2y + 24$

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

29.

The equation $C = 0.1t + 40$ represents the total amount charged by a cell phone company. Which table shows the relationship between the total charge, C , and the number of text messages, t ?

- Total Cell Phone Charges**

| Number of Text Messages, t | Total Charge, C |
|------------------------------|-------------------|
| 5 | \$45.10 |
| 10 | \$50.10 |
| 15 | \$55.10 |

☐ A

Total Cell Phone Charges

| Number of Text Messages, t | Total Charge, C |
|------------------------------|-------------------|
| 5 | \$40.50 |
| 10 | \$41.00 |
| 15 | \$41.50 |

☐ C

Total Cell Phone Charges

| Number of Text Messages, t | Total Charge, C |
|------------------------------|-------------------|
| 5 | \$45.00 |
| 10 | \$50.00 |
| 15 | \$55.00 |

☐ B

Total Cell Phone Charges

| Number of Text Messages, t | Total Charge, C |
|------------------------------|-------------------|
| 5 | \$40.05 |
| 10 | \$40.10 |
| 15 | \$40.15 |

☐ D

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

30.

Sheila can purchase books from a reading club for \$5 per book after depositing an initial amount of \$36 into the reading club account. Which table shows the total amount she will spend to purchase n number of books?

- Amount Spent for n Books**

| Number of Books, n | Amount Spent (dollars) |
|----------------------|------------------------|
| 42 | 210 |
| 45 | 225 |
| 55 | 275 |
| 60 | 300 |

☐ A

Amount Spent for n Books

| Number of Books, n | Amount Spent (dollars) |
|----------------------|------------------------|
| 12 | 437 |
| 15 | 545 |
| 23 | 833 |
| 25 | 905 |

☐ C

Amount Spent for n Books

| Number of Books, n | Amount Spent (dollars) |
|----------------------|------------------------|
| 12 | 96 |
| 15 | 111 |
| 23 | 151 |
| 25 | 161 |

☐ B

Amount Spent for n Books

| Number of Books, n | Amount Spent (dollars) |
|----------------------|------------------------|
| 42 | 174 |
| 45 | 189 |
| 55 | 239 |
| 60 | 264 |

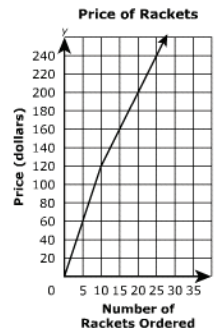
☐ D

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

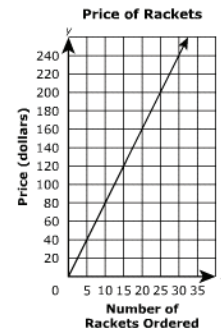
31.

The manager of a sports store ordered tennis rackets from a company. For the first 10 tennis rackets ordered, the price is \$12 per tennis racket. The price of additional rackets is \$8 per tennis racket. Which graph can be used to determine the amount the manager will need to pay for the tennis rackets ordered?

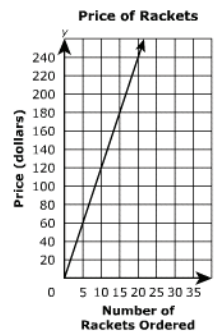
☐ A



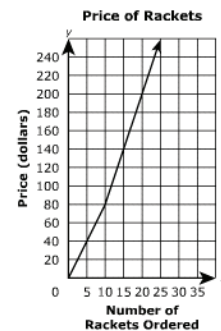
☐ C



☐ B



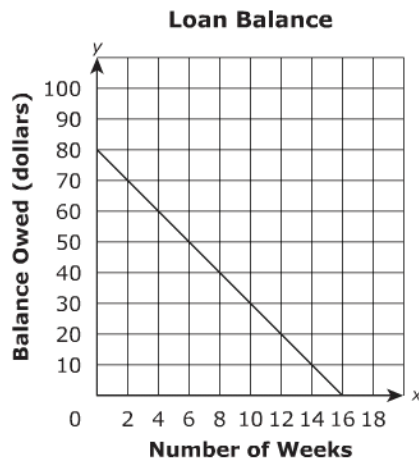
☐ D



Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

32.

Ralph borrowed \$80 from his sister. To repay the loan, he pays her weekly. The graph below models the balance, y , he owes after x weeks of payments.



Which equation best represents the relationship between the balance owed and the number of weeks?

☐ A $y = 80 - 10x$

☐ B $y = 80 - 5x$

☐ C $y = 80 + 5x$

☐ D $y = 80 + 10x$

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

33.

The table shows the amounts three students spent on wire for a science project.

| Wire Cost | | |
|-----------|--------------------------------|-----------|
| Student | Length of the Wire, w (feet) | Cost, c |
| Terrance | 3 | \$8.55 |
| Jimmy | 5 | \$14.25 |
| Vanessa | 6 | \$17.10 |

Which equation represents the relationship between the cost, c , and the length of the wire, w ?

- ☐ A $c = 11.4w$
- ☐ B $c = 8.55w$
- ☐ C $c = 5.7w$
- ☐ D $c = 2.85w$

Performance Indicator: 3102.1.4 Translate between representations of functions that depict real-world solutions.

34.

Which scenario best represents the equation $y = 1.5x + 15$?

- ☐ A the profit from selling x glasses of lemonade for \$1.50 per glass at a fair, if the booth rental is \$15
- ☐ B the total cost to rent skis for x hours at \$1.50 per hour, including an initial deposit amount of \$15
- ☐ C the amount of gasoline left in a car after traveling x minutes, if it initially had 15 gallons of gasoline and used 1.5 gallons per minute
- ☐ D distance covered by a biker after traveling x hours at a constant speed of 15 miles per hour and then traveling 1.5 miles at a different speed

Performance Indicator: 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.

35.

If the slope of the line $y = -4x + 1$ is multiplied by 4, what will happen to its graph?

- ☐ **A** The line will shift up 4 units.
- ☐ **B** The line will shift down 4 units.
- ☐ **C** The line will become 4 times as steep.
- ☐ **D** The line will become $\frac{1}{4}$ as steep.

Performance Indicator: 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving.

36.

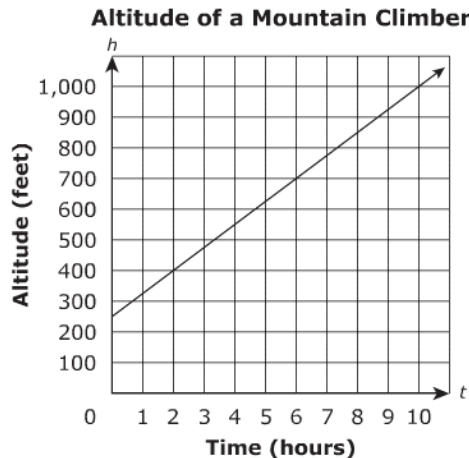
A line is represented by the equation $y = 6x + b$, where b is a positive number. How will the graph change if the value of b is increased by 3 units?

- ☐ **A** The line will shift to the right 3 units.
- ☐ **B** The line will shift to the left 3 units.
- ☐ **C** The line will shift down 3 units.
- ☐ **D** The line will shift up 3 units.

Performance Indicator: 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

37.

The graph shows the altitude, h , in feet, of a mountain climber after t hours.



What is the mountain climber's average climbing rate?

- ☐ A 75 feet per hour
- ☐ B 150 feet per hour
- ☐ C 250 feet per hour
- ☐ D 300 feet per hour

Performance Indicator: 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

38.

Ryan bicycled 100 miles from his home. The table shows his distance, in miles, from home at different times.

Ryan's Distance from Home

| Time (hours) | Distance (miles) |
|--------------|------------------|
| 1.5 | 30 |
| 2 | 40 |
| 2.5 | 50 |
| 3 | 60 |

What was Ryan's average speed?

- ☐ A 5 miles per hour
- ☐ B 10 miles per hour
- ☐ C 20 miles per hour
- ☐ D 25 miles per hour

Performance Indicator: 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

39.

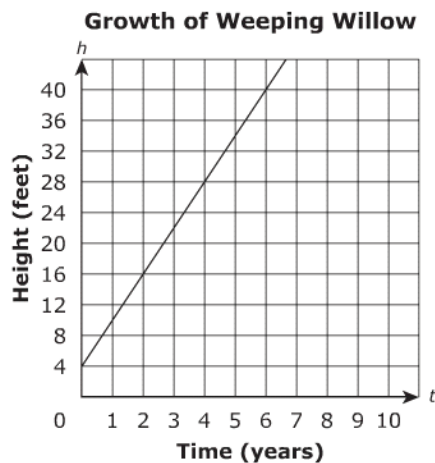
The total amount a daycare charges is represented by the equation $y = 175x + 50$, where y represents the total charge for x weeks. What does the slope represent in this situation?

- ☐ A the weekly charge
- ☐ B the total charge
- ☐ C the registration fee
- ☐ D the number of weeks

Performance Indicator: 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems.

40.

Lisa planted a weeping willow tree. The graph shows the height, h , of the tree over a period of t years.



According to the graph, what is the tree's growth rate?

- ☐ A 4 feet per year
- ☐ B 6 feet per year
- ☐ C 8 feet per year
- ☐ D 12 feet per year

Reporting Category 1: Mathematical Processes

| Item Number | Correct Answer | Performance Indicator |
|-------------|----------------|---|
| 1 | B | 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation. |
| 2 | A | 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation. |
| 3 | C | 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation. |
| 4 | C | 3102.1.2 Write an equation symbolically to express a contextual problem. |
| 5 | A | 3102.1.2 Write an equation symbolically to express a contextual problem. |
| 6 | B | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 7 | D | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 8 | B | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 9 | A | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 10 | D | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 11 | C | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 12 | A | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 13 | D | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 14 | C | 3102.1.4 Translate between representations of functions that depict real-world solutions. |

| | | |
|----|---|---|
| 15 | B | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 16 | C | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 17 | D | 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving. |
| 18 | B | 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems. |
| 19 | D | 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems. |
| 20 | B | 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems. |
| 21 | C | 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation. |
| 22 | A | 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation. |
| 23 | C | 3102.1.1 Interpret patterns found in sequences, tables, and other forms of quantitative information using variables or function notation. |
| 24 | B | 3102.1.2 Write an equation symbolically to express a contextual problem. |
| 25 | B | 3102.1.2 Write an equation symbolically to express a contextual problem. |
| 26 | D | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 27 | B | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 28 | A | 3102.1.3 Apply properties to evaluate expressions, simplify expressions, and justify solutions to problems. |
| 29 | C | 3102.1.4 Translate between representations of functions that depict real-world solutions. |

| | | |
|----|---|--|
| 30 | B | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 31 | A | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 32 | B | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 33 | D | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 34 | B | 3102.1.4 Translate between representations of functions that depict real-world solutions. |
| 35 | C | 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving. |
| 36 | D | 3102.1.5 Recognize and express the effect of changing constants and/or coefficients in problem solving. |
| 37 | A | 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems. |
| 38 | C | 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems. |
| 39 | A | 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems. |
| 40 | B | 3102.1.6 Determine and interpret slope in multiple contexts including rate of change in real-world problems. |